

New unworn dentitions illuminate the dental morphology and diversity of puzzling early eutherian mammals, Taeniodonta

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Taeniodonta is a group of North America Palaeogene mammals that lived after the end-Cretaceous mass extinction. Taeniodonts show an extreme degree of dental wear, indicative of an abrasive diet, leading to hypsodonty in the most derived species. The rarity of fossils and their highly worn teeth makes their dental morphology difficult to study. We examined five new partial mandibles from the San Juan Basin, New Mexico, USA, most of which preserve unworn molars. One of the specimens preserves a deciduous ultimate premolar and using 3D micro-CT we were able to segment and study the unworn permanent tooth embedded in the jaw. We then conducted multivariate analyses on dental measurements to compare the new specimens to known teeth of early taeniodonts. We assigned the new specimens to at least three genera of Conoryctidae, a taeniodont subclade. Our results suggest that there is a broader dental diversity of the studied genera than previously thought. Morphological observations also suggest that progressive loss of cingulids and the addition of cuspids started early in the evolution of taeniodonts. These distinctive dental specializations strengthen the hypothesis that early Palaeocene mammals were able to rapidly adapt to fill the vacant ecological niches after the end-Cretaceous extinction